

services and 9 cases of interference from other services into MSS.⁵³ However, the Committee could recommend final rule texts for only one such case, and could only make general recommendations for the others. In many of these cases, no significant interference problems were anticipated that could not be handled by existing criteria or procedures.

Specific rules were proposed by the NRM committee in Section 5.1 of its Report only for the case of radio astronomy protection zones addressed in the proposed subsection 25.213(a)(1). All of the other subsections proposed by the Commission either rely on general recommendations contained in Section 5.2 of the NRM Report or are apparently unrelated to the NRM Report.

In Section 25.213 of the proposed rules, the Commission specifies various provisions dealing with inter-service sharing issues. Subsection (a) deals with radio astronomy sharing and out-of-band emissions, subsection (b) deals with protection of radionavigation satellites (GPS) from out-of-band emissions, subsection (c) with the aeronautical radionavigation satellites (Glonass), and subsection (d) with sharing with the terrestrial fixed service. While Constellation continues to support the sharing arrangements that were unanimously agreed upon during the NRM, Constellation has serious objections to the manner in which those agreements are being implemented in §§ 25.143(b)(2)(iv) and 25.213 of the proposed rules.

⁵³ See Table 3-1 of the NRM Final Report for a listing of these cases.

A. The Commission Should Modify The Showing
Required By § 25.143(b)(2)(iv) To Cover Only
Specific Quantified Sharing Criteria

The proposed §25.143(b)(2)(iv) requires a showing that a LEO applicant does not cause "unacceptable" interference to any other authorized user of the band, and in particular, compliance with the requirements of the new §25.213 of the proposed rules. Constellation is concerned with the wording of the proposed §25.143(b)(2)(iv) which would require a showing that a LEO applicant does not cause "unacceptable" interference to any other authorized user of the band rather than a technical showing that the applicant complies with specific quantifiable sharing criteria, such as maximum power levels, etc.

The level of "unacceptable" interference is usually defined by a particular radio service without regard to whether it is practical for another service to provide that level of interference protection. The definition of an "unacceptable" level of interference is normally the first step in the coordination process between operators in two co-equal services by which each side defines what it desires in the way of protection. The coordination process then proceeds to the detailed technical analyses and negotiations that result in a set of operating constraints and perhaps stated levels of "accepted" interference on which the coordination agreement is based. As a result, "unacceptable" interference is not an enforceable concept until mutual agreement between the sharing services is reached at the end of the coordination process, and coordination involving new sharing situations is seldom

completed until long after licenses are granted by the Commission. Moreover, in this particular case, the Negotiated Rule Making meetings, which were intended to perform an inter-service negotiation function, did not result in a generally applicable agreement on a level of "unacceptable" interference to protect radio astronomy or Glonass receivers.⁵⁴

It is therefore impractical to require an applicant for a LEO satellite system to demonstrate that it does not cause "unacceptable" interference before the level is mutually agreed upon. If the Commission is to require in §25.143(b)(2)(iv) a showing of compatibility with other services at the time an application is filed, that showing must be with respect to some quantitative, pre-defined criteria that has been adopted by rule or has been mutually agreed upon by the parties concerned. Moreover, it would be unfair for the Commission to require an MSS applicant to demonstrate compliance with a level of "unacceptable" interference that is unilaterally defined by another co-equal service. At a minimum, the Commission must clearly specify what an MSS applicant must demonstrate in its application after affording the opportunity for public comment on the specifics through the rulemaking process. Thus, the Commission should not require in §25.143(b)(2)(iv) a showing that "unacceptable" interference will not be caused to other services, but

⁵⁴ In certain interference cases involving radio astronomy and radionavigation satellite services, a mutual agreement was reached that it was practical to provide the desired level of "unacceptable" interference protection, but agreement was not reached on providing the same level of protection in other interference cases. Thus, there was no mutual agreement to recognize the requested level of "unacceptable" interference protection as a generally applicable standard.

only a showing that an MSS system complies with specific, well defined sharing criteria defined in §25.213.⁵⁵

B. The Commission Should Include Only The Specific Sharing Criteria Mutually Agreed to By MSS and Radio Astronomy Communities

The NRM Committee reached agreement on the use of protection zones around specified radio astronomy sites to provide the protection requested by the radio astronomers. These protection zones are reflected in Section 25.213(a)(1) of the proposed rules.⁵⁶ Constellation supports adoption of this section of the Commission's proposed rules.

One of Constellation's service objective is to provide continuous service to its customers throughout the United States. Under the protection zone concept, the 1610-1613.8 MHz will not be used by Constellation's subscribers within the areas defined in the rules during periods of radio astronomy observations. This area amounts to about 480,000 square kilometers or about 5% of the United States. Constellation accepted the protection zone concept as a means of sharing the

⁵⁵ The Commission also proposes to require a showing of compliance with § 25.213 in §§ 25.115(d) and 25.130(b). Such showings are practical only with the changes proposed by Constellation to § 25.213 below.

⁵⁶ Constellation believes that the requirement in the first sentence of § 25.213(a)(1) for position determination capability was not included in the specific rule proposed in Section 5.1 of NRM Report. As written, it is unnecessarily broad and should be limited to earth stations transmitting in the radio astronomy band. Also, Constellation notes that only one set of coordinates were to be listed for the Green Bank protection zone in the NRM Report (see Attachment A to Annex 2 at Table 3-1, note 2) but that both sets of coordinates are included in the proposed rule.

1610.6-1613.8 MHz band with radio astronomy with the expectation that service would be provided to users located within the radio astronomy protection zones on frequencies between 1613.8 and 1626.5 MHz.

However, during the discussions in the NRM committee, it became apparent that the level of protection from out-of-band emissions desired by the radio astronomy community would prohibit transmission at significant distances from the radio astronomy site even at the upper edge of the band at 1626.5 MHz. Thus, no agreement was reached on the question of protecting radio astronomy reception in the 1610.6-1613.8 MHz band from these out-of-band emissions. In large part, this result reflected the extremely low signal levels which radio astronomers characterize as unacceptable, and the practical inability to design user transceivers that operate across the 1610-1626.5 MHz band⁵⁷ and suppress out-of-band emission levels to the levels desired by the radio astronomers when the user is located in the near vicinity of a radio astronomy site.

For this reason, Constellation objects to the use of the radio astronomy's definition of unacceptable interference in setting levels of out-of-band emissions and to the codification of these values in the Commission's rules in Sections 25.213(a)(2) and (a)(3). These levels were established by the radio astronomy community without regard to the capability of other services to provide this level of interference protection with reasonably priced equipment. While these levels were

⁵⁷ Or the 1610.0-1610.6 MHz band if narrow band emissions were employed by the MSS user terminals.

accepted during the NRM negotiations as the basis for establishing a co-channel geographic sharing arrangement between two co-equal primary services, the codification of these extremely stringent levels proposed by radio astronomers is not an acceptable method for establishing out-of-band emission limits on satellite or user terminal transmitters operating outside of the radio astronomy allocation⁵⁸.

There are several reasons for deleting Sections 25.213(a)(2) and (a)(3) from the final rules. First, the specific wording of these proposed rules was not adopted by the NRM committee because of objections raised by various parties. Second, the Commission has not established a public record to support the adoption of these sharing criteria. Third, the Commission should not codify levels of unacceptable interference unless they are agreed to by all parties within an overall coordination agreement. This is not the case here. Moreover, codifying the radio astronomy levels of "unacceptable" interference could set the precedent for radio astronomers to claim the same level of out-of-band emission protection throughout the radio spectrum. Finally, specifying out-of-band emission levels on the basis of received interference levels, rather than power or attenuation levels measured at the transmitter, would create confusion, and would be impractical to administer.

In summary, Constellation opposes any codification of the radio astronomy community's definition of "unacceptable" interference. In particular, Constellation opposes the adoption of the proposed Sections 25.213(a)(2) and (a)(3), and requests

⁵⁸ ITU RR 344 provides that "... protection from services in other bands shall be afforded the radio astronomy service only to the extent that such services are afforded protection from each other."

that these subsections be eliminated from the final rules adopted by the Commission.

C. Protection Of The Global Positioning System (GPS)

Section 25.213(b) specifies an out-of-band filtering requirement on mobile earth station transmitters in order to protect GPS receivers. This provision was mutually agreed to in the NRM Final Report (see paragraph 5.2.2.7).⁵⁹ However, Constellation emphasizes that its acceptance of this proposed rule is not an acceptance of the interference model used to develop the quantitative limits in this rule section or any criteria of "unacceptable" interference. This was simply a case where the out-of-band filtering required to provide the requested level of protection of GPS receivers was reasonable given the frequency separation between the lower end of the MSS band at 1610 MHz and GPS signals at 1575.42 MHz. Although the requested level of protection was accepted by the LEO community, it was without prejudice to the application of the interference protection model to any other case, i.e. Glonass, where it would be impractical to provide this same level of protection, and for which other solutions are required to avoid harmful interference.

⁵⁹ Paragraph 58 and note 101 of the Notice are somewhat confusing. Constellation believes that agreement was reached by all parties on protection of GPS through the rule proposed in Section 25.213(b) and is surprised by the Commission's comment that discussions are ongoing with respect to GPS.

D. Protection of Glonass

The 1610-1626.5 MHz is allocated to the mobile satellite service on a primary basis, both in the international table of frequency allocations and in the national table of frequency allocations, as a co-primary service with the aeronautical radionavigation service, including systems using space techniques under RR 732 (i.e. Glonass). Footnote RR 731F specifies a quantitative sharing criteria, i.e. a maximum EIRP density limit of -15 dB(W/4 kHz) from MSS transmitters, to protect Glonass receivers. Constellation believes that this -15 dB(W/4 kHz) EIRP density limit is the only enforceable sharing criteria that can be incorporated into the Commission's rules at this time, and that it is sufficient to recognize the status of Glonass under RR 732 in the Commission's service rules for the 1.6/2.4 GHz MSS.

Constellation believes that the proposed Section 25.213(c) should be limited to the case definition text and the first sentence of sub-paragraph (1). The remaining text of sub-paragraph (1) and all of (2) should be removed.⁶⁰ This amended rule provision is the only meaningful sharing criteria that could be imposed on a LEO system operator at this time, and it is the only one that Constellation can currently agree to.

⁶⁰ Constellation takes no position on the text of sub-paragraph (3) specifying a power flux density limit on satellites transmitting in the 1613.8-1626.5 MHz band since it does not propose to operate downlinks at L-band. Sub-paragraph (2) is a duplication of the proposed Section 25.136(a) where it properly belongs as a transceiver operating provision. It need not be repeated in Section 25.213 particularly since it is not a specific sharing criteria. For this reason, Constellation proposes its deletion from Section 25.213(c).

While Constellation accepts the need for coordination with the Glonass system, it objects to the remaining portion of §25.213(c)(1) which simply reiterates the rest of the text of footnote RR 731F. This text only confuses the co-equal allocation status between MSS and other services in the band and is inappropriate for detailed service rules. These requirements are already contained in the national frequency allocation table of §2.106 of the Commission's rules, and §25.111(b) makes any authorization subject to the results of international coordination. Thus, the current § 25.111(b) provides all the authority needed by the Commission to enforce the results of any international coordination agreements reached regarding the Glonass system.

No useful purpose is served by simply reiterating text from frequency allocations in §25.213(c)(1). If it is to be considered part of a new or separate coordination process for the 1.6/2.4 GHz MSS, these provisions are prejudicial to the MSS in any such coordination process and would put MSS operators at a disadvantage in any coordination to be undertaken after the license is issued. Until coordination agreements are reached which identify specific additional obligations, the Commission should not include in its service rules allocation provisions that are ambiguous and do not define the specific operating conditions under which a license is being issued. Alternatively, if the last two sentences of the proposed § 25.213(c)(1) are to be considered a required showing that is part of an MSS application, it is unlikely that an MSS applicant will be able to make such a showing in its application to the satisfaction of the aeronautical community at this time

given the experience in the NRM meetings. In particular, the remaining proposed text of Section 25.213(c)(1) is objectionable because it was not agreed to by the NRM committee as rule texts, duplicates other material in Sections 2.106 and 25.111(b) of the rules, and creates uncertainty as to the status and obligations of the licensee to which the Commission is issuing a license under Part 25. Until coordination agreements are reached which identify specific additional obligations, the Commission should not include in its service rules allocation provisions that are ambiguous and do not define the specific operating conditions under which a license is being issued.

It should be emphasized that the Glonass sharing problem must be solved as a condition for the Commission's L-Band plan to work. However, sharing has to be considered on the basis of protecting the overall GNSS system, and not a particular frequency path because of the redundancy of available frequencies among GPS and Glonass. In defining the level of interference protection to be afforded to Glonass, Constellation opposes adoption or use of the unrealistic interference model advocated by the aeronautical interests in the NRM because of the unreasonableness of the aviation community's definition of "unacceptable" interference.

E. Terrestrial Fixed And Mobile

With respect to the proposed Section 25.213(d) regarding sharing with fixed stations operating in certain countries outside of the United States and Commission jurisdiction under ITU footnote RR 730 in L-Band, the NRM Committee concluded that "no rule changes or modifications are needed."⁶¹ The United States is not one of the countries in RR 730, and there are no known terrestrial facilities licensed in the United States under this international allocation provision. The proposed Section 25.213(d) only repeats information contained in the international Radio Regulations which is already incorporated into § 2.106 of the Commission's rules. Moreover, Section 25.111(b) already requires the coordination mentioned in the proposed subparagraph (d) as a general matter. No purpose is served by this proposed section, nor the repetition of RR 731E, in the service rules for the 1.6/2.4 MHz MSS. The proposed Section 25.213(d) should therefore be deleted from the final rules to be adopted.

VIII. The 5.1 GHz and 6.5 GHz Bands Are Constellation's Preferred Feeder Link Bands For Its First Generation Satellites

Constellation proposes to operate its feeder links in the 6525-6591 MHz (Earth-to-space) and 5150-5216 MHz (space-to-Earth) bands. These are the same bands that are allocated for feeder links in RDSS systems operating in the

⁶¹ NRM Final Report, Section 5.2.2.9 at 45.

1610-1626.5 MHz and 2483.5-2500 MHz bands.⁶² Since Constellation proposed to include radiodetermination-satellite service as part of its service offerings, it believes that it is eligible to utilize the bands already allocated for this purpose. However, the Commission indicated in the Notice that the 5150-5216 MHz may not be available and has proposed that Ka-Band be used for feederlinks by all 1.6/2.4 GHz MSS systems.⁶³

A. Constellation's Feeder Link Requirements

Constellation proposes to operate its feeder links with non-steering, earth coverage beams on board the Constellation satellites and high gain, satellite tracking antennas at its gateway earth stations. Constellation feeder link requirements are described in Appendix C to these Comments. In Constellation's baseline design, a single 2.5 MHz r.f. channel would be used in each of 10 antenna beams, with all of the transponders being tunable in orbit⁶⁴ for flexibility in coordinating the final operating frequency plan. These feeder link requirements could be satisfied within a total bandwidth of 21 MHz which is well within the bandwidth of the current RDSS feeder link allocation. Additional feeder link spectrum would be required in an L-Band/S-Band interference sharing environment since the number of r.f.

⁶² See Section 25.202(a)(2) of the Commission's Rules.

⁶³ Notice, at 37-39.

⁶⁴ Constellation's baseline transponder design permits the basic transponder filtering and amplification to be done at a common intermediate frequency for all transponders to reduce cost and improve reliability, while allowing the mapping of feeder link and service link frequencies to be changed even after the satellite is in orbit.

channels per beam would have to be increased. If Constellation operated over the entire 11.35 MHz indicated in the Commission's L-band assignment plan, about 78 MHz of feeder link spectrum would be required if the feeder link operating frequencies permitted frequency re-use through orthogonal polarizations.⁶⁵ Thus, it can be seen that the interference sharing approach will have a significant increase on the amount of feeder link spectrum required by the Constellation system.

B. The 5.1/6.5 GHz Bands Are The Preferred Feeder Link Bands

Although the uplink feeder link band at 6525-6725 MHz has been allocated for fixed-satellite uplinks, which includes feeder links, for a long period of time, little or no use is being made of this band for satellite communications. The NRM Report concludes that "[t]he portions of the 6425-6725 MHz bands proposed by three of the pending applicants do not appear to present any insurmountable difficulties for uplink feeder link licensing."⁶⁶ The 5150-5216 MHz band was allocated by the 1987 WARC on a world-wide basis for space-to-Earth feeder links in RDSS satellite systems operating in the 1610-1626.5 MHz and 2483.5-2500 MHz bands.⁶⁷ This band is part of the 5000-5250 MHz band which is only lightly used

⁶⁵ The amount of feeder link spectrum required by future generations of Constellation satellites will be larger as additional satellite antenna beams are added to increase capacity and performance.

⁶⁶ NRM Final Report, § 4.3 at 31.

⁶⁷ See Footnote RR 797A and Report and Order in Gen. Docket No. 89-103 66 RR 2d (P&F) 1699 (1989).

by the aeronautical radionavigation service.⁶⁸ With the relatively favorable propagation conditions of these bands, and the lack of geostationary satellites in these bands, Constellation considers these feeder link bands ideal for 1.6/2.4 GHz MSS satellite systems and a natural progression from their initial allocation for RDSS feeder links in 1987.

During the NRM proceedings, the Federal Aviation Administration ("FAA") objected to the use of the 5150-5216 MHz band for space-to-Earth feeder links. However, little information was provided by the FAA concerning firm plans for the installation and operation of aeronautical radionavigation facilities in this band, or the technical characteristics of such facilities. It was apparent that any such plans are still in the very early stages of development. Moreover, it is not clear how extensively the lower part of the band between 5000 MHz and 5150 MHz will be used for implementing the Microwave Landing System ("MLS") now that GPS is available. It may be possible to accommodate some of the new systems being considered by the FAA in parts of the 5000-5150 MHz band not used by MLS.

The NRM committee concluded that "[i]f this band is not available, the Commission should identify at least one other downlink band between 3 and 15 GHz that would be available for assignment for non-geostationary satellite feeder

⁶⁸ The only known system in this band is the Microwave Landing System (MLS) which operates in only a portion of the band below 5150 MHz. The top 100 MHz was considered unnecessary for any conceivable growth of MLS at the 1987 WARC and allocations for RDSS feeder links and mobile services were made in the 5150-5250 MHz portion of the band. See Footnotes RR 797A and 797B.

links to satisfy the feeder link requirements identified."⁶⁹ Although the various alternative feeder link bands were reviewed by the Committee, none of the candidate bands identified are as desirable as the 5150-5250 MHz because of their existing usage or regulatory status.⁷⁰ All of the more likely alternative candidate bands appear to require changes in their international and domestic allocation status, and it is not clear that there is a sufficient amount of time remaining until the 1995 World Radio Conference ("WRC") to achieve successful results. Any delay beyond the 1995 WRC to resolve the question of LEO MSS feeder links between 3 and 15 GHz will likely be too late to incorporate such bands in the feeder links to be used by the pending applicants. For these reasons, Constellation urges the Commission to exert every effort to make available the 5150-5250 MHz band for feeder links for LEO satellites in the 1.6/2.4 GHz MSS.

C. Use Of The Ka-Band For Feeder Links Would Have A Severely Adverse Impact On The Constellation System

Utilizing Ka-band frequencies for feeder links will have a severely detrimental cost and operational impact on the Constellation system. These adverse impacts are described in Appendix C in terms of the impact on Constellation's service, operations, and cost. Diversity earth station sites separated by five to thirty

⁶⁹ NRM Final Report, § 4.3 page 31.

⁷⁰ Id. See also, Annex 3, § 4.3, at 18-20. More recently, reverse band use of the Fixed-Satellite Service Allotment bands has been identified as another candidate for LEO MSS feeder links.

kilometers will be required at Constellation's gateways, as well as higher transmit power, resulting in at least a doubling of its earth station costs. In addition, substantially higher satellite transmitter powers will be required resulting in a substantial satellite weight and cost increase.

Constellation notes that the Ka-band frequencies that might be available for LEO system feeder links are also at issue in a number of other proceedings. In addition to the applications of Hughes⁷¹ and Teledesic,⁷² the Commission has also begun a negotiated rulemaking proceeding in CC Docket No. 92-297 with respect to the new local multipoint distribution service ("LMDS") and fixed-satellite service sharing the 27.5-29.5 GHz band. The proposals of TRW, Inc. and Motorola to utilize the 19.7-20.2 GHz and 29.5-30.0 GHz bands for their feeder links was also addressed in the NRM Report. Unfortunately, the Commission's identification of the 27.5-30.0 GHz band in the Notice⁷³ does not match the 27.5-29.5 GHz band specified in the NRM Notice in CC Docket No. 92-297⁷⁴ and raises the question of how access to the more desirable parts of the Ka-band at 19.7-20.2 GHz and 29.5-30 GHz by additional 1.6/2.4 GHz MSS systems is going to be addressed. Also, it

⁷¹ Hughes Communications Galaxy, Inc. filed an application with the Commission on December 3, 1993 to operate the Spaceway Satellite System in the 20/30 GHz bands.

⁷² On March 21, 1994 Teledesic Corporation filed an application to construct, launch and operate a low-Earth orbit system consisting of 840 satellites in the 20/30 GHz bands.

⁷³ Notice at 77.

⁷⁴ FCC Asks for Comments Regarding the Establishment of an Advisory Committee to Negotiate Proposed Regulations, Public Notice 41726, released February 11, 1994. See also Constellation's "Comments" in response to that public notice.

is not clear that an uplink channeling plan in the 27.5-30.0 GHz band can be simply mapped into an equivalent downlink channeling plan in the 18.1-20.2 GHz band. Constellation will, of course, participate in the CC Docket No. 92-297 proceedings. However, the Commission's Notice did not lay out a clear path towards resolving all of the issues that affect the use of the Ka-band for 1.6/2.4 GHz MSS feeder links, and Constellation urges the Commission to clarify the procedures it intends to follow in resolving these issues and the various inter-related proceedings affecting these bands..

IX. The Service Rules Proposed For the 1.6/2.4 GHz MSS Service Should Be Adopted With Minor Changes And Clarification

In its Notice, the Commission has proposed a comprehensive set of service rules to govern the newly established 1.6/2.4 GHz MSS. In general, Constellation supports the adoption of these service rules. However, in a number of areas, the proposed rules require clarification or adjustment. In response to paragraph 93 of the Notice, Constellation presents specific rule text changes in Appendix A to these comments. In presenting these changes, proposed text deletions are indicated by striking through the text to be deleted and the addition of new text is indicated by underlining. A brief discussion of the reasons for the proposed change is also included. The following sections deal with general issues concerning the proposed Part 25 service rules.

A. Regulatory Classification

In the Notice the Commission requested comment "on whether MSS Above 1 GHz space station licensees making satellite capacity available to Commercial Mobile Radio Service ("CMRS") providers should be required to operate as common carriers" and how such operators should be regulated if they are not offering CMRS. Section 332(c)(5) of the Act, 47 U.S.C. § 332(c)(5), provides the Commission with the authority to determine whether the provision of space segment capacity by satellite systems to CMRS providers shall be treated as common carriage. Constellation believes that significant latitude must be provided to MSS licensees to offer satellite system capacity. Specifically, Constellation believes that MSS operators selling bulk capacity to CMRS providers should be regulated on a non-common carrier basis. These type of arrangements would not represent a "holding out to the eligible user public" as defined in National Association of Regulatory Utility Commissioners v. FCC. 525 F.2d 630, 642 (D.C. Cir), cert. denied, 425 U.S. 999 (1976) (NARUC I). This is because they would involve "bulk sale" of capacity to companies who would resell such capacity to the public at large. To limit how such offerings are made could inhibit the financial viability of the 1.6/2.4 GHz MSS. Relatedly, Constellation believes that specialized private communication services (e.g. dispatch, radiodetermination, private networks) that it or a reseller provides which are not interconnected into the public switched

network should be regulated on a non-common carrier basis. These are specialized service offerings that will be customized for individual customers.

With regard to the provision of CMRS by MSS licensees or gateway operators directly to the public, Constellation urges the Commission to institute the minimum level of regulation for these common carrier services as permitted under law. There is no discernable reason to impose strict common carrier regulation on this burgeoning new service offering.

B. Space Station Licensing

Constellation supports the blanket system license approach to authorizing operation of space stations in the 1.6/2.4 GHz MSS service described in paragraphs 82-85 of the Notice. However, there are a number of areas where clarification or minor changes would improve the rules.

In drafting the text of these rules, the Commission uses the term "technically identical" in a number of places. Constellation is concerned that this phrase may be applied too literally and may result in unnecessary administrative burdens on both licensees and the Commission. Minor technical changes in LEO satellites over the course of a ten year system lifetime are inevitable as new components and materials become available. With typical satellite lifetimes on the order of seven years, it should be expected that every satellite in an initial LEO system will be replaced at least once during the ten year license term. System operators will want to

incorporate the latest technology in their replenishment satellites. Minor changes in replenishment satellites may also result from operational experience and the availability of new or improved components. However, such upgraded or improved replacement satellites may not be "technically identical" to the initial satellites in the strict sense of the term. The Commission should not subject itself or its licensees to the administrative burdens that would be required if every technical change a licensee finds desirable over the course of a ten year period needs approval. To avoid such a situation, Constellation proposes that the Commission uses the term "with the same particulars of operation" instead of "technically identical." The term "particulars of operation" is directly related to specific spectrum use and interference effects which are the principal technical concerns of the Commission. Moreover, this term more closely reflects the parameters that are controlled by inter-system coordination agreements. This is particularly the case for CDMA interference sharing where only a few key parameters need to be controlled and the question of whether space stations are "technically identical" is largely irrelevant.

The proposed rules in Section 25.143 are somewhat confusing concerning the procedure for authorizing the construction of replacement satellites and in-orbit space satellites. Once a LEO satellite system consisting of 40 to 70 satellites has been operational for a few years, the system operator can expect to be engaged in a continuous and constantly changing process of launch and orbital contingency planning and operations. This situation would be particularly complex if the system operator uses two or more different launch vehicles with capabilities to launch

different numbers of satellites.⁷⁵ Thus, LEO operators will be continually assessing and re-assessing replenishment satellite launch and in-orbit spare satellite maneuver plans based on the current status of spacecraft health and performance. As a practical matter, there is no need for the Commission to require different regulatory treatment of the launch of replenishment satellites and the activation of in-orbit spare satellites if the principal concern of the Commission is that the system licensee not exceed the maximum number of actual operating satellites permitted. In essence, Constellation proposes minor changes to the wording of § 25.143 to clarify that the system license authorizes the construction, launch and operation of the initial "X" satellites needed to establish the complete system, and that the Commission waives any requirement for construction permits and launch authorizations for additional replacement or in-orbit spare satellites (absent a need for license modification), provided that the total number of satellites in actual operation does not exceed the limit specified in the system license. For this reason, Constellation also requests that the Commission clarify that the milestones discussed in paragraph 84 of the Notice apply only to the initial complement of operational satellites (i.e., the "X" value of satellites) and not to replenishment or spare satellites.

Constellation supports the concept of a filing window for system replacement applications contemplated in the amended § 25.120(e). However,

⁷⁵ Launch vehicles are typically selected either to launch a single satellite or to launch a number of satellites into a single orbital plane at one time. Because of the relatively large amount of energy needed to change orbital planes (compared to the relatively small amount of energy needed to change satellite position within the same plane), it is unlikely that a launch vehicle will be used to place satellites in different orbital planes.

clarification is requested on how this idea would be applied in practice. Specifically, § 25.120(e) provides for a very specific 60-day filing period determined by the date of launch of the first satellite in the system. Although all of the pending LEO applicants may receive their authorizations at the same time, they will probably launch their first satellites on different dates. As a result, each LEO system operator will have a specific filing window for their renewal applications, and some of these filing windows may not overlap. The potential difficulty that could arise under this formulation is that an application could be filed for a new (or modified replacement) 1.6/2.4 GHz MSS system which could be mutually exclusive with the planned renewal application for a second system, but the renewal application could not be filed under § 25.120(e) within the cut-off period of the first application. For this reason, Constellation proposes an amended version of § 25.120(e) that would permit the filing of a renewal application earlier in response to a cut-off notice of a potentially mutually exclusive application.

C. User Transceiver and Feeder Link Earth Station
Licensing Provisions

Constellation supports the proposed rules discussed in paragraphs 88-89 of the Notice governing earth station licensing provisions for the 1.6/2.4 GHz MSS. However, several minor amendments for clarification or procedural improvements are proposed in Appendix A to these comments.

Section 25.115(d) is being amended, presumably only to include 1.6/2.4 GHz MSS for transceiver licensing. But it is not clear why subparagraph (3) is needed for this service. Constellation does not believe that gateway or Telemetry, Tracking and Command (TT&C) earth station facilities will be a normal part of a 1.6/2.4 GHz MSS user transceiver blanket license application, and proposes a wording change to clarify this situation. In addition, Constellation proposes a wording change to § 25.136(b) that requires authorization for "specific" transmission to clarify that the person operating the transceiver requires authorization from the space licensee or service vendor, but that specific transmissions must be conducted pursuant to the signalling and control protocol of the system.

Finally, the proposed new § 25.203(j)-(k) are based on specific rule text recommendations (e) and (f) from § 5.1.3 of the NRM Report. However, the variance between the Commission's proposed text and that of the NRM Report requires clarification. The Commission's proposed text for § 25.203(j) includes a reference to the inter-satellite frequencies in § 25.202(a)(5) which would not be used for feeder links. The original intent of proposal (e) in Section 5.1.3 of the NRM Report was to take account of steerable, narrow beam feeder link antennas on board certain of the proposed LEO satellites using Ka-band feeder links in the bands mentioned in the text of the NRM Report, i.e., 18.8-20.2 GHz and 27.5-30 GHz. Such steerable feeder link satellite antennas are not planned for the Constellation

system, particularly for feeder links below 15 GHz.⁷⁶ Also, the Commission included space station applicants in the scope of § 25.203(k). This was not contemplated in proposal (f) of Section 5.13 of the NRM Report since the coordination between geostationary and non-geostationary space stations was to be conducted under the rule proposed in paragraph (c) of Section 5.13 of the NRM Report and is reflected in the new § 25.278 proposal by the Commission. Inclusion of a space station coordination requirement in § 25.203(k), which is intended only for earth station coordination, is unnecessary and confusing. Constellation proposes that the Commission revert to the specific rule proposal texts contained in the NRM Report.

E. Other Matters

Paragraph 87 of the Notice requests comments on whether any other service requirements should be imposed on MSS licensees in this proceeding. Constellation believes that the rules proposed by the Commission, with the changes indicated in Appendix A to these Comments, are sufficient at this time for the Commission to issue the licenses needed to establish a competitive domestic MSS industry. Until additional experience is gained with the development of this market, Constellation believes it would be unwise to impose any additional obligations on its licensees.

⁷⁶ See Appendix C to these comments.

With respect to the suggestion in paragraph 87 of the Notice regarding reservation of capacity for non-profit organizations, it is not clear whether the Commission is considering free or reduced price service, or only guaranteed access to LEO systems at reasonable charges. In either case, Constellation does not believe any such provisions are necessary or desirable.

The primary public benefits of the 1.6/2.4 GHz MSS will be new technology, new and innovative communications and services, and new jobs. Under the rules to be adopted by the Commission, the multiple system operators to be licensed will be competing among themselves, as well as with terrestrial mobile service facilities in at least the major urban and suburban areas. To the extent that the offer of service or capacity to non-profit organizations makes sense in such a competitive environment, Constellation and the other LEO operators will undoubtedly do so. However, a regulatory requirement that capacity be reserved for such a purpose, particularly if not imposed on other competitors, would only add unnecessary costs and operational constraints to the normal business start-up problems. Moreover, simply reserving space segment capacity is insufficient to achieve practical application results in fields like environmental monitoring or education. Such programs need ground station equipment, operators, teachers, software, and other elements to deliver the end services to beneficiaries of such a program. Since the satellite system licensee is not operating in a non-profit environment, requiring the licensee to support such a program would be an inefficient use of resources that could detract from the successful development of